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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/616,923 | 07/11/2003 | Haruki Fukai | XA-9907 | 2424 |
| 181 | 7590 | 07/12/2005 | EXAMINER | |
| MILES & STOCKBRIDGE PC 1751 PINNACLE DRIVE SUITE 500 MCLEAN, VA 22102-3833 | | | PHAM, THANH V | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2823 | |

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,923

Applicant(s)

FUKAI ET AL.

Examiner

Thanh V. Pham

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/11/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II (claims 6-14) in the reply filed on 04/29/2005 is acknowledged.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

4. Claim 6 is objected to because of the following informalities: "step (c)" at the end of the claim should be --step (e)--because only after step (e) there are portions of the contact layer and portions of the first semiconductor layer removed so that the upper surface of the contact layer has that recited limitation.

In the same manner, claim 10 is objected to because after step (c), there is no removed portion of the contact layer so that the contact layer has that recited limitation; it is suggested that "after the step (c)" is changed to --after the step (d)--, in lines 2-3 of claim 10.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Even step (e) opens to remove further downward to the plurality of semiconductor layers formed in step (a), the specification and the corresponding figures do not provide how, which and what of the plurality of semiconductor layers 11-16 being removed so that the recited limitation “after the step (e), the insulation film remains over the side walls of the plurality of semiconductor layers and over the side walls of the contact layer” can happen.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 6, 10 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyashita et al. US 5,835,516.

Re claim 6, the Miyashita et al. reference discloses a method of fabricating semiconductor laser comprising:

- (a) a step of forming a plurality of semiconductor layers 2/3/4/5 on a semiconductor substrate 1,
- (b) a step of forming a first semiconductor layer 6 over the plurality of semiconductor layers,
- (c) a step of forming a contact layer 7 consisting of a second semiconductor layer over the plurality of semiconductor layers,
- (d) a step of selective removing a portion of the contact layer, after this step, (re claim 10) the upper surface of the contact layer has a width in a first direction greater than a width of the lower surface of the contact layer in the first direction, fig. 1(b), and
- (e) a step of selective removing a portion of the first semiconductor layer, wherein the upper surface of the contact layer has a first direction width greater than a first direction width of the first semiconductor layer after the step (e), (re claim 14) the first semiconductor layer has a ridge shape, fig. 1(b).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 7-8 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. as applied to claims 6, 10 and 14 above, and further in view of Lin et al. (provided by the applicant) and Bowen et al. US Pub. 202/0119588 A1.

The Miyashita et al. reference discloses the process of fabricating semiconductor laser as stated. The reference teaches forming a buffer layer 8 and a current blocking layer 9 but lacks the further steps.

The Lin et al. reference (fig. 1 and the corresponding section on FABRICATION) discloses an SiO₂ dielectric layer is deposited on the side structure as current-blocking layer and a current window is opened by self-aligned technology (re claim 7) Ti/Pt/Au metals were used as both p and n metals (re claim 8). Fig. 1 also shows an n-type clad layer over the semiconductor substrate, an active layer over the n-type clad layer, and a first p-type clad layer over the active layer (re claim 11); the first semiconductor layer is a second p-type clad layer (re claim 12); the contact layer is formed from InGaAs. The first semiconductor layer is formed from InP (part of claim 13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the Miyashita et al. method with the insulation and further steps of Lin et al. to complete the process of forming a laser device because the dielectric formation and the further steps of Lin et al. would provide the method of Miyashita et al. with "high reliability and highly uniform characteristics in low threshold current, slope efficiency and lasing wavelength" as taught by Lin et al. (the Abstract).

The combination does not use etching solution containing H₃PO₄ (re claim 13, partially). However, the use of H₃PO₄ for etching InGaAs is known in the art as

disclosed by Bowen et al. in fabricating opto-electronic devices [0046]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the process of the combination with H_3PO_4 in the etching of InGaAs because the use of H_3PO_4 would provide the etching with enablement the alignment in the y-direction as taught by Bowen et al. [0046].


Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVP
06/29/05


George Fourson
Primary Examiner